

Pinephales promelas

SFIERR/ONALASKA/632013360

BIOASSAY REPORT *GWM*

ACUTE AND CHRONIC TOXICITY TESTS
 Conducted November 15 through 22, 1994

Prepared for
Onalaska Landfill
Groundwater Treatment Facility
Onalaska, Wisconsin

EC50
ACUTE

EC50
ACUTE

50

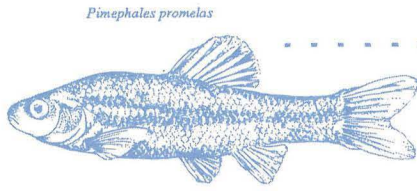
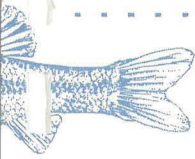


Daphnia magna

TRE

EC50
ACUTE

EC50
ACUTE



Pinephales promelas

Chronic LC50

Chronic LC50

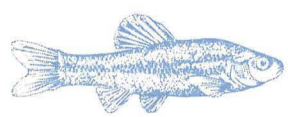


ACUTE



Daphnia magna

growth and reproduction



Pinephales promelas

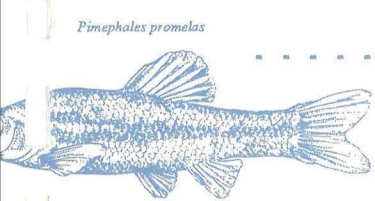
ACUTE



ome

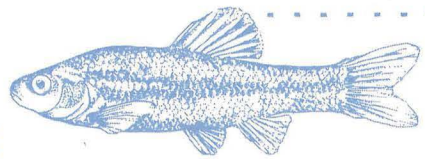
TRE

TRE



Pinephales promelas

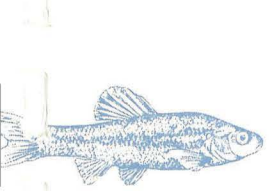
EC50
ACUTE



Pinephales promelas

Chronic LC50

Chronic LC50

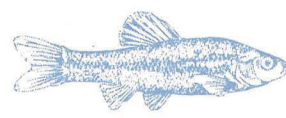


ACUTE



Daphnia magna

growth and reproduction



Pinephales promelas

ACUTE

Pinephales promelas

TRE

SF/ERR/ONALASKA/632013360

BIOASSAY REPORT GWM

ACUTE AND CHRONIC TOXICITY TESTS
Conducted November 15 through 22, 1994

Prepared for
Onalaska Landfill
Groundwater Treatment Facility
Onalaska, Wisconsin

Prepared by
CH2M HILL
Bioassay Laboratory
15779 West Ryerson Road
New Berlin, Wisconsin 53151

December 1994

Summary

CH2M HILL conducted acute and chronic toxicity tests on effluent samples provided by the Onalaska Landfill Groundwater Treatment Facility (LGTF), Onalaska, Wisconsin. The bioassays were conducted from November 15 through 22, 1994, as part of compliance biomonitoring for the State of Wisconsin. *Ceriodaphnia dubia*, *Daphnia magna*, and fathead minnows were used as the test organisms. The following is a summary of the test results:

Acute Toxicity

Test Media	<i>Ceriodaphnia dubia</i>		
	<i>dubia</i>	<i>Daphnia magna</i>	Fathead Minnow
Black River Control	Pass	Pass	Pass
100% Effluent	Pass	Pass	Pass
Laboratory Control	Pass	Pass	Pass

Chronic Toxicity

Test Media	<u><i>Ceriodaphnia dubia</i></u>		<u>Fathead Minnow</u>	
	Mean % Survival	Mean No. of Offspring	Mean % Survival	Mean Growth (mg)
Black River Control	100	31.2	85	0.457
3.7% Effluent (IWC)	100	35.1	87.5	0.531
5% Effluent	100	32.0	87.2	0.419
10% Effluent	100	31.9	92.5	0.454
20% Effluent	100	33.1	79.7	0.471
40% Effluent	100	30.4	92.5	0.435
80% Effluent	100	28.4	97.5	0.492
IC ₂₅		80%		> 80%
Laboratory Control	100	33.1	89.7	0.404
37% IWC (diluted with laboratory water)	100	30.1	92	0.449

For NPDES compliance purposes, the test results show that:

- The effluent samples were not acutely toxic to *Ceriodaphnia dubia*, *Daphnia magna*, or fathead minnows at 100 percent concentrations using the 50 percent lethality criteria.
- The effluent samples were not chronically toxic to either *Ceriodaphnia dubia* or fathead minnows at the 3.7 percent IWC. The concentration of effluent that was estimated to be chronically toxic to both test organisms, based on the IC₂₅ analysis, was greater than 80 percent.
- Black River and laboratory water data met test acceptability criteria in all acute and chronic bioassays.

MKE1001552B.WP5

Introduction

This report presents the results of the laboratory acute and chronic toxicity tests conducted by CH2M HILL on effluent samples provided by the Onalaska LGTF, Onalaska, Wisconsin. The bioassays used *Ceriodaphnia dubia*, *Daphnia magna*, and fathead minnows as the test organisms and were performed from November 15 through 22, 1994, as part of compliance biomonitoring for the State of Wisconsin.

Methods

All laboratory methods, including organism culture, sample handling, test procedures, and data analyses, were in accordance with the recommendations of the U.S. Environmental Protection Agency (EPA) [1, 2, 3, 4], the CH2M HILL Milwaukee Bioassay Laboratory's Standard Operating Procedures, and the Wisconsin Department of Natural Resources (DNR) biomonitoring requirements.

Sample Collection and Handling

Photocopies of the chain-of-custody forms are included in Appendix B. Three 24-hour composite effluent samples and one receiving water grab sample were used as follows:

Description	Sample No.	Date Collected	Date Tested
Black River	545.01	11/15	11/15-22
Stripping Tower Effluent	545.02	11/13-14	11/15-18
Stripping Tower Effluent	545.03	11/16-17	11/18-20
Stripping Tower Effluent	545.04	11/17-18	11/20-22

All samples were collected by Onalaska LGTF personnel and shipped or delivered on ice to the CH2M HILL Milwaukee Bioassay Laboratory. Upon arrival, samples were logged in and physicochemical characterizations were conducted. Samples not immediately prepared for testing were refrigerated (4°C) for later use.

Test Organisms

All test organisms were cultured at the CH2M HILL Milwaukee Bioassay Laboratory.

Test Procedures

Bioassays

Bioassay test conditions are summarized in Tables 1 through 5.

Table 1
Summary of Test Conditions for the
Ceriodaphnia **Acute Bioassay**
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 17, 1994

1. Test organism	<i>Ceriodaphnia dubia</i> (Crustacea: Cladocera).
2. Test type	Static renewal.
3. Age of test organisms	Less than 24 hours.
4. Test chamber size	30 mL
5. Test solution volume	25 mL
6. Renewal of test solutions	Daily.
7. Replicate chambers per treatment	4
8. Test organisms per chamber	5
9. Primary control/dilution water	Receiving water: Black River.
10. Internal control water	Laboratory culture medium.
11. Effluent concentrations	6.25, 12.5, 25, 50, and 100%
12. Temperature	20 ± 1°C
13. Feeding regime	None.
14. Aeration	None.
15. Test duration	48 hours.
16. Sampling scheme	One 24-hour composite effluent sample. Maximum holding time of 48 hours between completion of collection and initial test use. One receiving water grab sample collected within 48 hours of test initiation. Laboratory water used was collected daily.
17. Effects measured	Survival.
18. Test acceptability	90% or greater mean survival in the laboratory or receiving water control.

Table 2
Summary of Test Conditions for the
***Daphnia* Acute Bioassay**
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 17, 1994

1. Test organism	<i>Daphnia magna</i> (Crustacea: Cladocera).
2. Test type	Static renewal.
3. Age of test organisms	Less than 24 hours.
4. Test chamber size	30 mL
5. Test solution volume	25 mL
6. Renewal of test solutions	Daily.
7. Replicate chambers per treatment	4
8. Test organisms per chamber	5
9. Primary control/dilution water	Receiving water: Black River.
10. Internal control water	Laboratory culture medium.
11. Effluent concentrations	6.25, 12.5, 25, 50, and 100%
12. Temperature	$20 \pm 1^{\circ}\text{C}$
13. Feeding regime	None.
14. Aeration	None.
15. Test duration	48 hours.
16. Sampling scheme	One 24-hour composite effluent sample. Maximum holding time of 48 hours between completion of collection and initial test use. One receiving water grab sample collected within 48 hours of test initiation. Laboratory water used was collected daily.
17. Effects measured	Survival.
18. Test acceptability	90% or greater mean survival in the laboratory or receiving water control.

Table 3
Summary of Test Conditions for the
Fathead Minnow Acute Bioassay
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 19, 1994

1. Test organism	<i>Pimephales promelas</i> (Osteichthyes: Cyprinidae).
2. Test type	Static renewal.
3. Age of test organisms	31 days old.
4. Test chamber size	500 mL
5. Test solution volume	400 mL
6. Renewal of test solutions	Daily.
7. Number of replicate chambers per treatment	2
8. Number of test organisms per chamber	10
9. Primary control/dilution water	Receiving water: Black River.
10. Internal control water	Laboratory culture medium.
11. Effluent concentrations	6.25, 12.5, 25, 50, and 100%
12. Temperature	$20 \pm 1^{\circ}\text{C}$
13. Feeding regime	None.
14. Aeration	None, unless DO concentration falls below 40% saturation (then, continuous at rate not exceeding 100 bubbles/minute).
15. Test duration	96 hours.
16. Loading rate	Less than 0.65 g/L.
17. Sampling scheme	Two separate 24-hour composite effluent samples, each used for a 48-hour exposure. Maximum holding time of 48 hours between completion of collection and initial test use for each sample. One grab sample of receiving water collected within 48 hours of test initiation. Laboratory water used was collected daily.
18. Effects measured	Survival.
19. Test acceptability	90% or greater mean survival in the laboratory or receiving water control.

Table 4
Summary of Test Conditions for the
Ceriodaphnia **Chronic Bioassay**
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 21, 1994

1. Test organism	<i>Ceriodaphnia dubia</i> (Crustacea: Cladocera).
2. Test type	Static renewal.
3. Age of test organisms	Less than 24 hours, all released within an 8-hour period (same generation from even-aged parents).
4. Test chamber size	30 mL
5. Test solution volume	15 mL
6. Renewal of test solutions	Daily.
7. Number of replicate chambers per treatment	10
8. Number of test organisms per chamber	1
9. Primary control/dilution water	Receiving water: Black River.
10. Secondary control water	Laboratory culture medium.
11. Effluent concentrations	3.7, 5, 10, 20, 40, and 80%; and an additional 3.7% using laboratory water for dilution.
12. Temperature	25 ± 1°C
13. Feeding regime	0.1 mL each of YCT culture food and algae per test chamber daily.
14. Aeration	None.
15. Test duration	6 days. (Controls had 3 broods.)
16. Sampling scheme	Three 24-hour composite effluent samples, each used for a minimum of 48 consecutive exposure hours. Maximum holding time of 48 hours between completion of collection and initial test use of each sample. One grab sample of receiving water collected within 48 hours of test initiation. Laboratory water used was collected as one batch.
17. Effects measured	Survival and reproduction.
18. Test acceptability	Laboratory or receiving water control with 80% or greater mean survival, an average of 15 or more young per surviving female, and at least 60% producing three broods.

Table 5
Summary of Test Conditions for the
Fathead Minnow Chronic Bioassay
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 22, 1994

1. Test organism	<i>Pimephales promelas</i> (Osteichthyes: Cyprinidae).
2. Test type	Static renewal.
3. Age of test organisms	Larval, less than 24 hours.
4. Test chamber size	500 mL
5. Test solution volume	300 mL
6. Renewal of test solutions	Daily.
7. Number of replicate chambers per treatment	4
8. Number of test organisms per chamber	10
9. Primary control/dilution water	Receiving water: Black River.
10. Secondary control water	Laboratory culture medium.
11. Effluent concentrations	3.7, 5, 10, 20, 40, and 80%; and an additional 3.7% using laboratory water for dilution.
12. Temperature	25 ± 1°C
13. Feeding regime	0.15 mL brine shrimp nauplii (less than 24 hours old) twice daily.
14. Aeration	None, unless DO concentration falls below 40% saturation (then, continuous at rate not exceeding 100 bubbles/min).
15. Cleaning	Siphon daily, immediately before test solution renewal.
16. Test duration	7 days.
17. Sampling scheme	Three 24-hour composite effluent samples, each used for a minimum of 48 consecutive exposure hours. Maximum holding time of 48 hours between completion of collection and initial test use of each sample. One grab sample of receiving water collected within 48 hours of test initiation. Laboratory water used was collected daily.
18. Effects measured	Survival and growth (biomass).
19. Test acceptability	Laboratory or receiving water control with 80% or greater mean survival, and surviving fish with at least 0.25 mg average dry weight.

Physicochemical Monitoring

Total alkalinity, hardness, and total ammonia were measured initially on each new sample. Total residual chlorine was measured initially on each effluent sample. Total alkalinity and hardness were measured once in the laboratory control media.

Dissolved oxygen (DO), pH, and conductivity were measured initially and daily thereafter in all test treatment renewals. DO and pH were measured in one test chamber or composite of each 24-hour-old test solution.

Bioassay incubator temperature was electronically monitored hourly by thermocouple and data logger, and a 24-hour summary of mean values was recorded.

Data Analysis

Pass/fail criteria were applied to acute toxicity data. A modified EPA mathematical analysis was used to estimate an IC₂₅ (the concentration that is inhibited 25 percent from the control data) on chronic toxicity data. The IC₂₅ value generated is the linear interpolation estimate.

Toxicity was defined according to the following DNR criteria:

Acute Toxicity

- Less than 50 percent survival of test organisms in 100 percent effluent at test termination (48 hours for *Ceriodaphnia dubia* and *Daphnia magna*, and 96 hours for fathead minnow).

Chronic Toxicity

- IC₂₅ value for *Ceriodaphnia dubia* reproduction or fathead minnow biomass less than the 3.7 percent instream wastewater concentration (IWC) after a nominal 7-day exposure.

Quality Assurance

Part of the quality assurance and quality control (QA/QC) program at the CH2M HILL Milwaukee Bioassay Laboratory includes the performance of organisms concurrently tested in laboratory media. Tables 1 through 5 present the test acceptability criteria for laboratory control data. The results of the laboratory control tests are listed in Tables 6 and 7.

In addition, other QA/QC procedures include performing monthly reference toxicant tests using reagent-grade sodium chloride. The results of reference toxicant tests conducted

during the past 12 months on the appropriate test organisms are summarized in Appendix C.

Results

Photocopies of the laboratory data and computer printouts of the statistical analyses are found in Appendix A. There were no excursions from the protocols and all test conditions were within the limits required by the EPA and the DNR. The test results are summarized below.

Acute Bioassays

Table 6 presents the acute bioassay results. No acute toxicity was demonstrated to *Ceriodaphnia dubia*, *Daphnia magna*, or fathead minnows in the 100 percent effluent concentration. Black River and laboratory control data were acceptable in all tests.

Table 6
Summary of Results of Acute Bioassays
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 19, 1994

Test Media	Mean Percent Survival		
	<i>Ceriodaphnia dubia</i>	<i>Daphnia magna</i>	Fathead Minnow
Black River Control	100	100	100
6.25% Effluent	100	100	100
12.5% Effluent	100	100	100
25% Effluent	100	100	100
50% Effluent	100	100	100
100% Effluent	100	100	100
Laboratory Control	100	100	100

Chronic Bioassays

Table 7 presents the chronic bioassay results. No chronic toxicity was indicated to *Ceriodaphnia dubia* or fathead minnows at the 3.7 percent IWC using the IC₂₅ criteria. The IC₂₅ values for both reproduction and growth were greater than 80 percent.

Black River and laboratory control water data were acceptable in both bioassays.

Table 7
Summary of Results of Chronic Bioassays
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
November 15 through 22, 1994

Test Media	<i>Ceriodaphnia dubia</i>		Fathead Minnow	
	Mean % Survival	Mean No. of Offspring	Mean % Survival	Mean Growth (mg)
Black River Control	100	31.2	85	0.457
3.7% Effluent (IWC)	100	35.1	87.5	0.531
5% Effluent	100	32.0	87.2	0.419
10% Effluent	100	31.9	92.5	0.454
20% Effluent	100	33.1	79.7	0.471
40% Effluent	100	30.4	92.5	0.435
80% Effluent	100	28.4	97.5	0.492
IC ₂₅		80%		> 80%
Laboratory Control	100	33.1	89.7	0.404
37% IWC (diluted with laboratory water)	100	30.1	92	0.449

Physicochemical Data

All physicochemical parameters measured satisfied the bioassay requirements (see Appendix A).

Conclusions

The results of the laboratory bioassays conducted on effluent samples collected by the Onalaska LGTF on November 14, 17, and 18, 1994, show:

- The effluent samples were not acutely toxic to *Ceriodaphnia dubia*, *Daphnia magna*, or fathead minnows at 100 percent concentrations using the 50 percent lethality criteria.
- The effluent samples were not chronically toxic to either *Ceriodaphnia dubia* or fathead minnows at the 3.7 percent IWC. The concentration of effluent that was estimated to be chronically toxic to both test organisms, based on the IC₂₅ analysis, was greater than 80 percent.
- Black River and laboratory water data met test acceptability criteria in all acute and chronic bioassays.

References

1. Weber, C. I. (ed.). 1993. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms* (Fourth Edition). EPA/600/4-90/027F. U.S. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. 293 p.
2. Denny, J. S. 1987. *Guidelines for the Culture of Fathead Minnows, Pimephales promelas, for Use in Toxicity Tests*. EPA/600/3-87/001. U.S. EPA, Environmental Research Laboratory, Duluth, Minnesota. 42 p.
3. Weber, C. I., et al. 1989. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (Second Edition). EPA/600/4-89/001. U.S. EPA, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. 249 p.
4. Weber, C. I., et al. 1989. *Supplement to Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (Revision 1). EPA/600/4-89/001a. U.S. EPA, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. 42 p.

MKE1001552B.WP5

APPENDIX A
LABORATORY DATA SHEETS
AND STATISTICAL ANALYSES

48-HOUR ACUTE TEST INITIAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: TSE 142.32 CLIENT: ONALASKA LANDFILL
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: CULTURE MEDIA
 SAMPLE No.(s): 545-01, .02, 03, 04 CONTROL/DILUENT: BLACK RIVER
 SAMPLE DESCRIPTION: EFFLUENT
 TEST START DATE: 11-16-94 TIME: 1000 TEST END DATE: 11-18-94 TIME: 1030
 ANALYST(s): Stark, Trammel CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HR)		COMMENTS
			0	24	
1	LAB	DO	8.9	8.5	
		pH	8.0	8.2	
		COND	0.19	0.17	
2	BLACK RIVER	DO	8.8	8.5	
		pH	7.9	8.1	
		COND	0.18	0.18	
3	6.25%	DO	9.2	8.9-2.5C	
		pH	7.9	8.6	
		COND	0.20	0.20	
4	12.5%	DO	9.2	9.2	
		pH	7.9	8.0	
		COND	0.21	0.21	
5	25%	DO	9.3	9.3	
		pH	7.9	8.0	
		COND	0.25	0.24	
6	50%	DO	9.4	9.4	
		pH	8.0	8.1	
		COND	0.31	0.29	
7	100%	DO	9.3	9.3	
		pH	8.1	8.1	
		COND	0.42	0.39	
DATE			11-16	11-17	
SAMPLE No.			.02	.02	
DETERMINED BY			JS	JZ	

*DO as mg/L COND as mmho

48-HOUR ACUTE TEST FINAL CHEMICAL DATA*

(1-7 TREATMENTS)

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media
 SAMPLE No.(s): 545.01, .02 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 1200 TEST END DATE: 11-18-94 TIME: 1030
 ANALYST(s): Trammel CODE: _____

FINAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)		COMMENTS
			24	48	
1	LAB	DO	8.4	8.4	
		pH	8.1	8.1	
2	Black River	DO	8.4	8.5	
		pH	8.1	8.0	
3	6.25%	DO	8.5	8.6	
		pH	8.0	8.0	
4	12.5%	DO	8.6	8.7	
		pH	8.0	8.0	
5	25%	DO	8.7	8.7	
		pH	8.1	8.0	
6	50%	DO	8.7	8.7	
		pH	8.2	8.2	
7	100%	DO	8.7	8.7	
		pH	8.3	8.2	
DATE			11-17	11-18	
DETERMINED BY			JC	JC	

*DO as mg/L COND as mmho

48-HOUR ACUTE BIOASSAY SURVIVAL DATA

(4 Reps. 1-7 Treatments)

PROJECT No.: BE14732 CLIENT: Onalaska Landfill
 TEST ORGANISM: Scenedaphnia dubia AGE: < 24H LOT No.: 578
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, 545.02
 LAB MEDIA/No.: Culture media CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 1000 TEST END DATE: 11-18-94 TIME: 1030
 ANALYST(s): J. Trammel CODE: _____

TREAT. NO.	TEST SOLN	REP	FATALITIES PER EXPOSURE PERIOD (Hrs)		TOTAL FATAL.	MEAN SURV.	COMMENTS
			24	48			
1	LAB	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
2	Black River	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
3	6.25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
4	12.5%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
5	25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
6	50%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
7	100%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		

DATE	11-17	11-17
DETERMINED BY	JT	JT

48-HOUR ACUTE TEST INITIAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: TSE 142.32 CLIENT: Onaleska Landfill
 TEST ORGANISM: Daphnia magna LAB MEDIA /No.: Culture media
 SAMPLE No.(s): 545-01, 02 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 1015 TEST END DATE: 11-18-94 TIME: 1040
 ANALYST(s): J. Trammel CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HR)		COMMENTS
			0	24	
1	LAB	DO	8.9	8.5	
		pH	8.0	8.2	
		COND	0.19	0.17	
2	Black River	DO	8.8	8.5	
		pH	7.9	8.1	
		COND	0.18	0.18	
3	6.25%	DO	9.2	8.9	
		pH	7.9	8.0	
		COND	0.20	0.26	
4	12.5%	DO	9.2	9.2	
		pH	7.9	8.0	
		COND	0.21	0.21	
5	25%	DO	9.3	9.3	
		pH	7.9	8.0	
		COND	0.25	0.24	
6	50%	DO	9.4	9.4	
		pH	8.0	8.1	
		COND	0.31	0.29	
7	100%	DO	9.3	9.3	
		pH	8.1	8.1	
		COND	0.42	0.39	
DATE			11-16	11-17	
SAMPLE No.					
DETERMINED BY			JS	JC	

*DO as mg/L COND as mmho

48-HOUR ACUTE TEST FINAL CHEMICAL DATA*

(1-7 TREATMENTS)

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Daphnia magna LAB MEDIA /No.: Culture media
 SAMPLE No.(s): 545.01, .02 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 1015 TEST END DATE: 11-18-94 TIME: 1040
 ANALYST(s): J. Trammel CODE: _____

FINAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)		COMMENTS
			24	48	
1	LAB	DO	8.4	8.8	
		pH	8.0	7.9	
2	Black River	DO	8.4	8.7	
		pH	8.0	7.9	
3	6.25%	DO	8.4	8.7	
		pH	8.0	7.9	
4	12.5%	DO	8.4	8.7	
		pH	8.0	8.0	
5	25%	DO	8.4	8.7	
		pH	8.1	8.0	
6	50%	DO	8.4	8.7	
		pH	8.2	8.1	
7	100%	DO	8.4	8.6	
		pH	8.3	8.1	
DATE			11-17	11-18	
DETERMINED BY			JT	JT	

*DO as mg/L COND as mmho

48-HOUR ACUTE BIOASSAY SURVIVAL DATA

(4 Reps. 1-7 Treatments)

PROJECT No.: ISE 14732 CLIENT: Onalaska Land S: 11
 TEST ORGANISM: DAPHNIA magna AGE: < 24H LOT No.: 362
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02
 LAB MEDIA/No.: Culture media CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 1015 TEST END DATE: 11-18-94 TIME: 1040
 ANALYST(s): J. Trammel CODE: _____

TREAT. NO.	TEST SOLN	REP	FATALITIES PER EXPOSURE PERIOD (Hrs)		TOTAL FATAL.	MEAN SURV.	COMMENTS
			24	48			
1	LAB	A	0	0	0	100%	* 4B - ONLY 4 BUGS SET. JC
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
2	Black River	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
3	6.25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
4	12.5%	A	0	0	0	100%	
		B	0*	0	0		
		C	0	0	0		
		D	0	0	0		
5	25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
6	50%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
7	100%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
DATE			11-17	11-18			
DETERMINED BY			JC	JC			

96-HOUR ACUTE TEST INITIAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: TSE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media
 SAMPLE No.(s): 545.01, .02, .03 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 1030 TEST END DATE: 11-20-94 TIME: 1100
 ANALYST(s): J. Trammel CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)				COMMENTS
			0	24	48	72	
1	LAB	DO	8.8	8.5	8.5	8.9	
		pH	7.9	8.0	7.9	7.6	
		COND	0.18	0.18	0.17	0.20	
2	Black River	DO	8.8	8.9	8.5	9.0	
		pH	7.9	8.1	7.8	7.7	
		COND	.18	.18	0.18	0.18	
3	6.25%	DO	9.2	8.9	9.1	9.2	
		pH	7.9	8.0	7.8	7.6	
		COND	.20	.20	0.19	0.20	
4	12.5%	DO	9.2	9.2	9.2	9.4	
		pH	7.9	8.0	7.8	7.8	
		COND	.21	.21	0.21	0.22	
5	25%	DO	9.3	9.3	9.2	9.4	
		pH	7.9	8.0	7.8	7.8	
		COND	.25	.24	0.22	0.24	
6	50%	DO	9.3	9.3	9.3	9.5	
		pH	8.0	8.1	7.9	7.9	
		COND	.31	.29	0.30	0.29	
7	100%	DO	9.3	9.3	9.3	9.6	
		pH	8.1	8.1	7.9	8.0	
		COND	.42	.39	0.40	0.39	
DATE			11-16	11-17	11-18	11-19	
SAMPLE No.			.02	.02	.03	.03	
DETERMINED BY			JS	JS	JS	JS	

*DO as mg/L COND as mmho

96-HOUR ACUTE TEST FINAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media
 SAMPLE No.(s): 545.01, .02, .03 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 10:30 TEST END DATE: 11-20-94 TIME: 11:00
 ANALYST(s): J. Trammel CODE: _____

FINAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)				COMMENTS
			24	48	72	96	
1	LAB	DO	7.1	7.6	8.0	8.5	
		pH	8.0	7.8	8.0	7.6	
2	Black River	DO	7.4	7.7	8.0	8.3	
		pH	7.9	7.8	7.9	7.6	
3	6.25%	DO	7.5	7.9	8.1	8.3	
		pH	7.9	7.7	7.8	7.6	
4	12.5%	DO	7.6	7.9	8.0	8.3	
		pH	7.8	7.7	7.8	7.6	
5	25%	DO	7.7	8.1	8.1	8.3	
		pH	7.9	7.7	7.8	7.7	
6	50%	DO	7.7	8.1	8.0	8.4	
		pH	7.9	7.8	7.8	7.8	
7	100%	DO	7.7	8.2	7.7	8.2	
		pH	7.9	7.8	7.9	7.8	
DATE			11-17	11-18	11-19	11-20	
DETERMINED BY			JC	JC	JC	JC	

*DO as mg/L

96-HOUR ACUTE BIOASSAY SURVIVAL DATA

(1 - 7 Treatments)

PROJECT No.: TSE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: ~~31 D~~ 31 D LOT No.: 1554
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03
 LAB MEDIA/No.: Culture media CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: ~~11:20~~ 10:30 TEST END DATE: 11-20-94 TIME: 1100
 ANALYST(s): J. Trammel CODE: _____

TREAT. NO.	TEST SOLN	REP	FATALITIES PER EXPOSURE PERIOD (Hrs)				TOTAL FATALITIES	MEAN SURVIVAL
			24	48	72	96		
1	LAB	A	0	0	0	0	0	100%
		B	0	0	0	0		
2	Black River	A	0	0	0	0	0	100%
		B	0	0	0	0		
3	6.25%	A	0	0	0	0	0	100%
		B	0	0	0	0		
4	12.5%	A	0	0	0	0	0	100%
		B	0	0	0	0		
5	25%	A	0	0	6	0	0	100%
		B	0	0	0	0		
6	50%	A	0	0	0	0	0	100%
		B	0	0	0	0		
7	100%	A	0	0	0	0	0	100%
		B	0	0	0	0		
DATE			11-17	11-18	11-19	11-20		
DETERMINED BY			JL	JL	JL	JL		

COMMENTS:

CHRONIC TEST
INITIAL CHEMICAL DATA*

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media/545.CCL
 SAMPLE No.(s): 545.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 1200 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): Stark, Cooke, Trammel CODE: _____

TREAT NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
1	Lab	DO	8.3	8.2	8.2	8.3	8.1	8.1	8.2	
		pH	8.2	7.8	7.9	7.9	7.9	7.9	7.9	
		COND	.23	.20	.21	.20	.20	0.20	0.18	
2	River	DO	8.4	8.1	8.2 ⁹⁰	8.5	8.4	7.9	8.2	
		pH	8.0	7.9	8.0	7.8	7.8	7.9	8.0	
		COND	.20	.19	.19	.19	.19	.19	0.19	
3	3.7%	DO	8.4	8.2	7.9	8.4	8.4	7.9	8.1	
		pH	7.9	7.9	7.9	7.9	7.8	7.8	8.0	
		COND	.21	.20	.22	.21	.20	.20	0.21	
4	5%	DO	8.4	8.1	8.0	8.3	8.4	8.0	8.1	
		pH	7.9	7.9	8.0	7.9	7.8	7.8	8.1	
		COND	.21	.20	.22	.21	.20	.21	0.21	
5	10%	DO	8.5	8.1	8.1	8.2	8.4	8.0	8.1	
		pH	7.9	7.9	8.0	8.0	7.8	7.8	8.1	
		COND	.23	.21	.24	.22	.22	.22	0.22	
6	20%	DO	8.5	8.1	8.1	8.1	8.4	7.9	8.1	
		pH	7.9	7.9	8.0	8.0	7.9	7.8	8.1	
		COND	.25	.24	.31	.25	.25	.25	0.25	
7	40%	DO	8.5	8.1	8.2	8.1	8.4	8.0	8.2	
		pH	7.9	7.9	8.0	8.0	8.0	7.9	8.2	
		COND	.29	.30	.46	.30	.28	.29	0.28	
DATE			11-16	11-17	11-18	11-19	11-20	11-21	11-22	
SAMPLE No.			.02	.02	.03	.03	.04	.04	.04	
DETERMINED BY			JS	JS	JL	JL	JL	JL	JL	

*DO = DISSOLVED OXYGEN (mg/L) COND = CONDUCTIVITY (mmho)

CHRONIC TEST
FINAL CHEMICAL DATA*

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media/545-CC
 SAMPLE No.(s): 545.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 1200 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): Stark, Cooke, Trammel CODE: _____

TREAT. NO.	TEST SOLN	PARA-METER	EXPOSURE DAY						
			1	2	3	4	5	6	7
1	Lab	DO	7.7	8.1	8.2	8.3	8.4	8.2	
		pH	8.2	8.1	8.0	7.9	8.0	8.0	
2	River	DO	7.8	8.1	8.1	8.2	8.4	8.2	
		pH	8.2	8.1	7.9	8.0	7.9	8.0	
3	3.7 %	DO	8.0	8.1	8.2	8.2	8.4	8.2	
		pH	8.2	8.0	7.9	7.9	7.9	8.0	
4	5 %	DO	8.0	8.1	8.2	8.1	8.3	8.2	
		pH	8.2	8.0	7.9	7.9	8.0	8.0	
5	10 %	DO	8.1	8.1	8.1	8.2	8.3	8.2	
		pH	8.2	8.1	7.9	7.9	8.0	8.1	
6	20 %	DO	8.1	8.1	8.2	8.1	8.2	8.2	
		pH	8.2	8.1	7.9	7.9	8.0	8.1	
7	40 %	DO	8.1	8.1	8.1	8.2	8.2	8.2	
		pH	8.2	8.2	7.9	7.9	8.0	8.1	
DATE			11-17	11-18	11-19	11-20	11-21	11-22	
DETERMINED BY			JS	JS	JS	JS	JS	JS	

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

COMMENTS:

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: TSE 142-32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia AGE: <24 hr. LOT No.: 578
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 545-CCL CONTROL/DILUENT: Black River water
 TEST START DATE: 11-16-94 TIME: 12:00 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): schut, Cooke CODE: _____ PAGE 1 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS			
			1	2	3	4	5	6	7	8	9	10				
1	Lab	1	OK	—————→												
		2	OK	—————→												
		3	8	5	5	7	6	5	3	5	6	5				
		4	G	—————→												
		5	12	11	10	10	12	13	6	12	13	11				
		6	18	15	17	15	14	17	15	18	16	16				
		7														
												SUMMARY				
												TOTAL	MEAN			
NO. of YOUNG			38	31	32	32	32	35	29	35	35	32	331	33.1		
NO. of BROODS			3	3	3	3	3	3	3	3	3	3	30	3		
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100		
TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS			
2	Black River	1	OK	—————→												
		2	OK	—————→												
		3	5	6	4	4	5	3	7	5	0	7				
		4	G	10	G	—————→										
		5	11	6	11	9	13	11	12	10	14	12				
		6	16	14	14	16	15	14	14	12	18	14				
		7														
												SUMMARY				
												TOTAL	MEAN			
NO. of YOUNG			32	30	29	29	33	28	33	27	38	33	312	31.2		
NO. of BROODS			3	3	3	3	3	3	3	3	3	3	30	3		
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100		
EXPOSURE DAY		0	1	2	3	4	5	6	7							
DATE		11-16	11-17	11-18	11-19	11-20	11-21	11-22								
DETERMINED / FED BY		SS	SS	SS	SS	SS	JK	JK								

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: TSE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia AGE: <24 hr. LOT No.: 578
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 545. CCL CONTROL/DILUENT: Black River water
 TEST START DATE: 11-16-94 TIME: 1200 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): schur, Cooke CODE: _____ PAGE 2 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS										
			1	2	3	4	5	6	7	8	9	10											
3	3.7%	1	ok																				
		2	ok																				
		3	6	6	6	5	8	7	6	5	6	6											
		4	G				14	G															
		5	10	15	13	6	15	12	10	11	14	11											
		6	16	15	18	19	15	18	16	17	18	13											
		7																					
												SUMMARY											
												TOTAL	MEAN										
NO. of YOUNG			32	36	37	38	38	37	32	33	38	30	351	35.1									
NO. of BROODS																							
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL	100								
4	5%	1	ok																				
		2	ok																				
		3	5	4	5	4	3	6	5	0	5	5											
		4	0	0	10	0	0	0	0	6	0	4											
		5	14	11	6	12	10	9	14	12	12	8											
		6	16	14	18	16	14	17	14	17	16	14											
		7																					
												SUMMARY											
												TOTAL	MEAN										
NO. of YOUNG			35	29	33	32	27	32	33	35	33	31	320	32.0									
NO. of BROODS																							
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL	100								
EXPOSURE DAY			0	1	2	3	4	5	6	7													
DATE			11-16	11-17	11-18	11-19	11-20	11-21	11-22														
DETERMINED / FED BY			JS	JS	JS	JS	JS	JS	JS														

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: TSE 142-32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia AGE: <24 hr. LOT No.: 578
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 545. CCL CONTROL/DILUENT: Black River water
 TEST START DATE: 11-16-94 TIME: 1200 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): Schur, Cooke CODE: _____ PAGE 3 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS
			1	2	3	4	5	6	7	8	9	10	
5	10%	1	OK →										
		2	OK →										
		3	5	3	5	7	7	6	6	5	4	5	
		4	0	0	8	0	0	0	0	0	0	0	
		5	14	11	6	14	11	11	3	10	12	14	
		6	19	16	14	16	16	18	13	14	17	15	
		7											

		SUMMARY											
		TOTAL										MEAN	
NO. of YOUNG		38	30	27	37	34	35	22	29	33	34	319	31.9
NO. of BROODS													
ADULT FATALITIES		0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS
			1	2	3	4	5	6	7	8	9	10	
6	20%	1	OK →										*Adult injured during transfer - do not use
		2	OK →										
		3	5	5	5	4	7	6	5	6	6*	5	
		4	6								AD	6	
		5	14	11	10	12	13	12	9	13		14	
		6	16	20	16	17	16	14	12	16		15	
		7											

		SUMMARY											
		TOTAL										MEAN	
NO. of YOUNG		35	36	31	33	36	32	26	35	34	34	298	33.1
NO. of BROODS													
ADULT FATALITIES		0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100

EXPOSURE DAY	0	1	2	3	4	5	6	7
DATE	11-16	11-17	11-18	11-19	11-20	11-21	11-22	
DETERMINED / FED BY	JS	JS	JS	JS	JS	JS	JS	

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia AGE: <24 hr. LOT No.: 578
 SAMPLE DESCRIPTION: Effluent +
 SAMPLE No.(s): 545-01, -02, -03, -04
 LAB MEDIA/No.: Culture media/545-CCL CONTROL/DILUENT: Black River water
 TEST START DATE: 11-16-94 TIME: 1200 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): schur, Cooke CODE: _____ PAGE 4 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS
			1	2	3	4	5	6	7	8	9	10	
7	40%	1	ok	—————→									
		2	ok	—————→									
		3	4	3	7	5	6	5	4	4	6	6	
		4	G	—————→									
		5	8	10	12	11	11	6	11	11	12	11	
		6	13	16	18	16	13	16	13	15	14	14	
		7											
												SUMMARY	
												TOTAL	MEAN
NO. of YOUNG												304	30.4
NO. of BROODS													
ADULT FATALITIES												0	% SURVIVAL 100
8	80%	1	ok	—————→									
		2	ok	—————→									
		3	4	6	5	6	4	6	6	5	6	5	
		4	G	—————→									
		5	12	9	12	10	10	11	12	10	13	11	
		6	12	10	13	11	11	12	12	15	12	13	
		7											
												SUMMARY	
												TOTAL	MEAN
NO. of YOUNG												284	28.4
NO. of BROODS													
ADULT FATALITIES												0	% SURVIVAL 100
EXPOSURE DAY		0	1	2	3	4	5	6	7				
DATE		11-16	11-17	11-18	11-19	11-20	11-21	11-22					
DETERMINED / FED BY		JS	JS	JS	JS	JS	JS	JS					

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: TSE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia AGE: <24hr LOT No.: 578
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 545. CCL CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 12:00 TEST END DATE: 11-22-94 TIME: 1130
 ANALYST(s): SCHUT, Cooke CODE: _____ PAGE 5 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS					
			1	2	3	4	5	6	7	8	9	10						
9	Lab Iluc 3.7%	1	ok															
		2	ok															
		3	4	6	5	5	3	3	2	6	3	5	4					
		4	G															
		5	14	11	11	11	9	10	12	4	10	8						
		6	17	18	13	16	16	15	19	14	17	13						
		7																

													SUMMARY	
													TOTAL	MEAN
NO. of YOUNG			35	35	29	32	28	27	37	21	32	25	301	30.1
NO. of BROODS														
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100	

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS				
			1	2	3	4	5	6	7	8	9	10					
		1															
		2															
		3															
		4															
		5															
		6															
		7															

													SUMMARY	
													TOTAL	MEAN
NO. of YOUNG														
NO. of BROODS														
ADULT FATALITIES													% SURVIVAL	

EXPOSURE DAY	0	1	2	3	4	5	6	7
DATE	11-16	11-17	11-18	11-19	11-20	11-21	11-22	
DETERMINED / FED BY	JS	JS	JS	JS	JS	JS	JS	

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

Inhibition Concentration
Calculation
(ICx)

CH2M Hill
July 1991

Client: ONALASKA LANDFILL
Project Number: TSE 142.32
Test Solution: EFFLUENT
Test Date: 11/16/94
Test Organism: CERIODAPHNIA dubia
Response Measured: REPRODUCTION

Concentration (%)	Mean Response	Smoothed Mean Response
Control	31.200	33.150
3.70	35.100	33.150
5.00	32.000	32.337
10.00	31.900	32.337
20.00	33.111	32.337
40.00	30.400	30.400
80.00	28.400	28.400

IC25 (%) Toxic Units
Linear Interpolation Estimate > 80.00

CHRONIC TEST
INITIAL CHEMICAL DATA*

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media/545. CFL
 SAMPLE No.(s): 545.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Schutz, Cooke CODE: _____

TREAT NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
1	Lab	DO	8.4	6.1	8.1	8.2	8.2	7.9	8.3	
		pH	8.1	8.1	8.1	7.9	8.2	7.9	8.2	
		COND	0.17	.18	.18	.17	.20	0.18	0.21	
2	Black River	DO	8.4	8.2	8.2	8.5	8.4	7.9	8.2	
		pH	8.0	8.0	8.0	7.8	7.8	7.9	8.0	
		COND	.20	.21	.19	.19	.19	0.19	0.19	
3	3.7%	DO	8.4	8.2	7.9	8.4	8.4	7.9	8.1	
		pH	7.9	8.0	7.9	7.9	7.8	7.8	8.0	
		COND	.21	.21	.22	.21	.20	0.20	0.21	
4	5%	DO	8.5	8.1	8.0	8.3	8.4	8.0	8.1	
		pH	7.9	8.0	8.0	7.9	7.8	7.8	8.1	
		COND	.21	.21	.22	.21	.20	0.21	0.21	
5	10%	DO	8.4	8.1	8.1	8.2	8.4	8.0	8.1	
		pH	7.9	8.1	8.0	8.0	7.8	7.8	8.1	
		COND	.23	.23	.24	.22	.22	0.22	0.22	
6	20%	DO	8.5	8.0	8.1	8.1	8.4	7.9	8.1	
		pH	7.9	8.1	8.0	8.0	7.9	7.8	8.1	
		COND	³ .29.25	.25	.31	.25	.25	0.25	0.25	
7	40%	DO	8.5	8.0	8.2	8.1	8.4	8.0	8.2	
		pH	7.9	8.1	8.0	8.0	8.0	7.9	8.2	
		COND	³ .40.29	.31	.46	.30	.28	0.29	0.28	
DATE			11-16	11-17	11-18	11-19	11-20	11-21	11-22	
SAMPLE No.			.02	.02	.03	.03	.04	.04	.04	
DETERMINED BY			JS	JK	JK	JK	JK	JK	JK	

*DO = DISSOLVED OXYGEN (mg/L) COND = CONDUCTIVITY (mmho)

CHRONIC TEST CHEMICAL DATA* (1-4 TREATMENTS)

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead Minnow LAB MEDIA /No.: Culture media /545.CFL
 SAMPLE No.(s): 545.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Schut, Coogle CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
8	80%	DO	8.5	8.1	8.1	8.4	8.4	8.0	8.2	
		pH	7.9	8.2	8.1	8.0	7.9	8.0	8.3	
		COND	.40	.38	.47	.40	.38	0.38	0.38	
9	IWC Lab 3.7%	DO	8.4	8.2	8.0	8.1	8.3	8.0	8.3	
		pH	8.0	8.2	8.0	7.8	8.1	8.1	8.2	
		COND	.22	.19	.20	.19	.20	0.24	0.22	
3		DO								
		pH								
		COND								
4		DO								
		pH								
		COND								
DATE			11-16	11-17	11-18	11-19	11-20	11-21	11-22	
SAMPLE No.			.02	.02	.03	.03	.04	.04	.04	
DETERMINED BY			JS	JS	JS	JS	JS	JS	JS	

FINAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			1	2	3	4	5	6	7	
8	80%	DO	7.2	6.2	7.2	6.0	6.9	8.2	6.0	
		pH	8.2	7.9	7.7	7.6	7.9	8.1	7.6	
9	IWC Lab 3.7%	DO	6.9	6.3	7.4	6.1	6.9	7.8	6.7	
		pH	8.0	7.8	7.9	7.5	8.0	8.1	7.7	
3		DO								
		pH								
4		DO								
		pH								
DATE			11-17	11-18	11-19	11-20	11-21	11-22	11-23	
DETERMINED BY			JS	JS	JS	JS	JS	JS	JS	

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

CHRONIC TEST
FINAL CHEMICAL DATA*

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media/ 545.CFL
 SAMPLE No.(s): 545.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Schut, Cooke CODE: _____

TREAT. NO.	TEST SOLN	PARA-METER	EXPOSURE DAY						
			1	2	3	4	5	6	7
1	LAB	DO	7.6	6.7	7.8	7.4	7.2	7.8	6.9
		pH	7.8	7.6	7.7	7.6	7.9	8.0	7.8
2	Black River	DO	7.6	7.0	7.6	7.2	7.3	8.0	7.2
		pH	7.8	7.6	7.7	7.5	7.9	8.0	7.7
3	3.7%	DO	7.6	7.0	7.7	7.2	7.4	8.2	7.4
		pH	7.8	7.6	7.7	7.5	7.9	8.0	7.7
4	5%	DO	7.4	7.0	7.8	7.2	7.3	8.1	7.4
		pH	7.8	7.6	7.7	7.5	7.9	8.0	7.7
5	10%	DO	7.3	6.9	7.7	7.2	7.5	8.1	7.4
		pH	7.9	7.6	7.7	7.5	7.9	8.0	7.7
6	20%	DO	7.3	7.0	7.6	7.3	7.6	8.1	7.4
		pH	7.9	7.6	7.7	7.5	7.9	8.0	7.7
7	40%	DO	7.7	6.4	7.7	6.8	7.4	8.1	7.4
		pH	7.9	7.7	7.7	7.5	7.9	8.0	7.6
DATE			11-17	11-18	11-19	11-20	11-21	11-22	11-23
DETERMINED BY			JS	JS	JS	YML	JS	JS	JS

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

COMMENTS:

CHRONIC BIOASSAY SURVIVAL DATA

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnows AGE: 424h LOT No.: 1585
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media/545 CFL CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Schut, Cook CODE: _____

TREAT. NO.	TEST SOLUTION	REP	NUMBER OF FATALITIES PER DAY							TOTAL NUMBER		% SURVIVAL	MEAN SURVIVAL	COMMENTS
			1	2	3	4	5	6	7	SURVIVORS	FATALITIES			
1	Lab	A	0	1	0	0	0	0	0	9	1	90	89.7%	x 9 fish set a 1 fish lost in handling
		B	0	0	0	0	1	0 ^a	0	8	1	88.9		
		C	0 ^x	0	0	0	0	0	0	9	0	100		
		D	0	0	0	2	0	0	0	8	2	80		
2	Black River	A	0	0	1	1	1	0	0	7	3	70	85%	
		B	0	0	0	1	1	0	0	8	2	80		
		C	0	0	1	0	0	0	0	9	1	90		
		D	0	0	0	0	0	0	0	10	0	100		
3	3.7%	A	0	0	0	1	0	1	0	8	2	80	87.5%	
		B	0	0	0	1	0	0	0	9	1	90		
		C	0	0	0	1	0	0	0	9	1	90		
		D	0	0	1	0	0	0	0	9	1	90		
4	5%	A	0	0	0	0	0	0	0	10	0	100	87.2%	
		B	0	0	0	0	0	0	0	10	0	100		
		C	0 ^x	0	0	1	0	0	0	8	1	88.9		
		D	0	0	0	3	0	1	0	6	4	60		
5	10%	A	0	0	0	0	0 ^a	0	0	9	0	100	92.5%	
		B	0	0	0	1	0	0	0	9	1	90		
		C	0	0	0	0	0	0	1	9	1	90		
		D	0	0	0	0	1	0	0	9	1	90		
6	20%	A	0	0	1	1	1	0	0	7	3	70	79.7%	
		B	0	0	0	2	0	0	0	8	2	80		
		C	0 ^x	0	0	1	0	0	0	8	1	88.9		
		D	0	0	0	1	1	0	0	8	2	80		
7	40%	A	0	0	0	0	0	0	0	10	0	100	92.5%	
		B	0	0	1	0	0	0	0	9	1	90		
		C	0	0	0	0	0	0	0	10	0	100		
		D	0	0	1	0	1	0	0	8	2	80		

DATE	11-17	11-18	11-19	11-20	11-21	11-22	11-23
DETERMINED BY	JS	JS	JS	mm	JL	JL	JL
FEEDING	DAY	0	1	2	3	4	5
	AM		✓	✓	✓	✓	✓
	PM	✓	✓	✓	✓	✓	✓

CHRONIC BIOASSAY SURVIVAL DATA

PROJECT No.: TSE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: 24h LOT No.: 1585
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 545. CFL CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Schut, Cooke CODE: _____

TREAT. NO.	TEST SOLUTION	REP	NUMBER OF FATALITIES PER DAY							TOTAL NUMBER		% SURVIVAL	MEAN SURVIVAL	COMMENTS
			1	2	3	4	5	6	7	SURVIVORS	FATALITIES			
8	80%	A	0	0	0	0	0	0	0	10	0	100	97.5%	a one fish lost in handling
		B	0	0	0	1	0	0	0	9	1	90		
		C	0	0	0	0	0	0	0	10	0	100		
		D	0	0	0	0	0	0	0	9	0	100		
9	IWC 3.7% (w/Lab)	A	0	0	0	0	0	0	0	10	0	100	92%	x only 9 fish set
		B	0	0	0	0	0	0	0	10	0	100		
		C	0	0	0	1	0	0	1	7	2	77.8		
		D	0	0	0	1	0	0	0	9	1	90		
3		A												
B														
C														
D														
4		A												
B														
C														
D														
5		A												
B														
C														
D														
6		A												
B														
C														
D														
7		A												
B														
C														
D														

DATE	11-17	11-18	11-19	11-20	11-21	11-22	11-23
DETERMINED BY	JS	OS	JS	VMK	JL	JL	JL
FEEDING	DAY	0	1	2	3	4	5
	AM		✓	✓	✓	✓	✓
	PM	✓	✓	✓	✓	✓	✓

CHRONIC BIOASSAY GROWTH DATA

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: 24H LOT No 1585
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media/545, CFL CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Stark CODE: _____

TEST SOLN	TREAT REP	TARE (mg)	TARE + DRY WT (mg)	TOTAL WT (mg)	Signif. Difference Test		IG25 Test	
					No. Surv.	Organism Wt.	No. Exposed	Organism Wt.
Lab	1A	1136.05	1140.04	3.99			10	0.399
	1B	1126.97	1130.89	3.92			9	0.436
	1C	1129.68	1133.48	3.80			9	0.422
	1D	1135.64	1139.22	3.58			10	0.358
Black River	2A	1117.59	1122.00	4.41			10	0.441
	2B	1109.91	1114.01	4.10			1	0.410
	2C	1107.43	1112.02	4.59			1	0.459
	2D	1137.03	1142.22	5.19			1	0.519
3.7%	3A	1139.66	1144.11	4.45			10	0.445
	3B	1129.54	1135.07	6.53			1	0.653
	3C	1129.33	1134.53	5.20			1	0.520
	3D	1100.23	1105.29	5.06			1	0.506
5%	4A	1104.94	1109.87	4.93			10	0.493
	4B	1139.84	1142.84	3.00			10	0.300
	4C	1127.95	1132.59	4.64			9	0.516
	4D	1134.38	1138.04	3.66			10	0.366
10%	5A	1111.64	1116.12	4.48			9	0.498
	5B	1110.23	1114.22	3.99			10	0.399
	5C	1118.12	1122.67	4.55			10	0.455
	5D	1118.56	1123.20	4.64			10	0.464
20%	6A	1119.66	1123.88	4.22			10	0.422
	6B	1125.19	1129.70	4.51			10	0.451
	6C	1103.44	1108.57	5.13			9	0.570
	6D	1127.86	1132.26	4.40			10	0.440
40%	7A	1109.27	1114.20	4.93			10	0.493
	7B	1134.91	1137.82	2.91			1	0.291
	7C	1117.11	1122.52	5.38			1	0.538
	7D	1114.01	1118.17	4.16			1	0.416

COMMENTS:

Mean 1 =	Mean 1 = 0.404
Mean 2 =	Mean 2 = 0.457
Mean 3 =	Mean 3 = 0.531
Mean 4 =	Mean 4 = 0.419
Mean 5 =	Mean 5 = 0.454
Mean 6 =	Mean 6 = 0.471
Mean 7 =	Mean 7 = 0.435

CHRONIC BIOASSAY GROWTH DATA

PROJECT No.: TSE 142-32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: L24H LOT No.: 1585
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 545.01, .02, .03, .04
 LAB MEDIA/No.: Culture media/545.CFL CONTROL/DILUENT: Black River
 TEST START DATE: 11-16-94 TIME: 0830 TEST END DATE: 11-23-94 TIME: 0830
 ANALYST(s): Stark CODE: _____

TEST SOLN	TREAT REP	TARE (mg)	TARE + DRY WT. (mg)	TOTAL WT. (mg)	Signif. Difference Test		IC25 Test	
					No. Surv.	Organism Wt.	No. Exposed	Organism Wt.
80%	87A	1104.34	1109.32	4.98			10	0.498
	87B	1130.73	1135.47	4.74			10	0.474
	87C	1120.78	1125.63	4.85			10	0.485
	87D	1121.49	1126.08	4.59			9	0.510
3.7% w/lab	92A	1127.70	1132.34	4.64			10	0.464
	92B	1132.92	1137.48	4.56			10	0.456
	92C	1105.27	1109.21	3.94			9	0.438
	92D	1108.13	1112.52	4.39			10	0.439
	3A							
	3B							
	3C							
	3D							
	4A							
	4B							
	4C							
	4D							
	5A							
	5B							
	5C							
	5D							
	6A							
	6B							
	6C							
	6D							
	7A							
	7B							
	7C							
	7D							

COMMENTS:

Mean 1 =	Mean 7 = 8 0.492
Mean 2 =	Mean 7 = 9 0.449
Mean 3 =	Mean 3 =
Mean 4 =	Mean 4 =
Mean 5 =	Mean 5 =
Mean 6 =	Mean 6 =
Mean 7 =	Mean 7 =

Inhibition Concentration
Calculation
(ICx)

CH2M Hill
July 1991

Client: ONALASKA LANDFILL
Project Number: TSE 142.32
Test Solution: EFFLUENT
Test Date: 11/16/94
Test Organism: FATHEAD MINNOW
Response Measured: GROWTH

Concentration (%)	Mean Response	Smoothed Mean Response
Control	0.405	0.458
3.70	0.533	0.458
5.00	0.420	0.458
10.00	0.455	0.458
20.00	0.470	0.458
40.00	0.435	0.458
80.00	0.490	0.458

IC25 (%) Toxic Units
Linear Interpolation Estimate > 80.00

BIOASSAY SAMPLE RECEIPT CHARACTERIZATION

CLIENT ALASKA GROUNDWATER TREATMENT PROJECT NO. TSE142.32

DATE RECVD	SAMPLE NO. DESCRIPTION	TEMP (C)	DO (mg/L)	pH	COND (mmho)	INITIALS
11-15-94	545.02 545.01 EFFLUENT # 1	5°	9.8	7.5	.41	JT
FILTER <input checked="" type="checkbox"/> DECHLORINATE <input type="checkbox"/> USE: IMMEDIATE <input checked="" type="checkbox"/> STORE (4 C) <input type="checkbox"/> ALIQUOTS HOMOGENIZED <input type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR <input type="checkbox"/> APPEARANCE: CLEAR <input type="checkbox"/> CLOUDY <input checked="" type="checkbox"/> SOLIDS <input checked="" type="checkbox"/> COLOR <input type="checkbox"/> COMMENTS						
11-16-94	545.02 RIVER	15°	10.5	7.9	.20	KP
FILTER <input checked="" type="checkbox"/> DECHLORINATE <input type="checkbox"/> USE: IMMEDIATE <input checked="" type="checkbox"/> STORE (4 C) <input type="checkbox"/> ALIQUOTS HOMOGENIZED <input type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR <input type="checkbox"/> APPEARANCE: CLEAR <input type="checkbox"/> CLOUDY <input checked="" type="checkbox"/> SOLIDS <input checked="" type="checkbox"/> COLOR <u>yellow</u> COMMENTS						
11-18-94	545.03 EFFLUENT # 2	10°	10.7	8.0	.37	JT/KP
FILTER <input checked="" type="checkbox"/> DECHLORINATE <input type="checkbox"/> USE: IMMEDIATE <input checked="" type="checkbox"/> STORE (4 C) <input type="checkbox"/> ALIQUOTS HOMOGENIZED <input type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR <input type="checkbox"/> APPEARANCE: CLEAR <input type="checkbox"/> CLOUDY <input checked="" type="checkbox"/> SOLIDS <input checked="" type="checkbox"/> COLOR <u>GOLD</u> COMMENTS						
11-18-94	545.04 EFFLUENT # 3	9°	9.8	8.1	.35	JT/KP
FILTER <input checked="" type="checkbox"/> DECHLORINATE <input type="checkbox"/> USE: IMMEDIATE <input type="checkbox"/> STORE (4 C) <input checked="" type="checkbox"/> ALIQUOTS HOMOGENIZED <input type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR <input type="checkbox"/> APPEARANCE: CLEAR <input type="checkbox"/> CLOUDY <input checked="" type="checkbox"/> SOLIDS <input checked="" type="checkbox"/> COLOR <u>GOLD</u> COMMENTS						

TEST TEMPERATURE SUMMARY

PROJECT No.: TSE 142.32 CLIENT: Onalaska Landfill

ACUTE TEST TEMPERATURE

	DATE								
	11-16-94	11-17	11-18	11-19	11-20				
AVG	20.1	19.9	19.8	20.0	20.2				
MAX									
MIN									
SUM. BY:	mw →								

CHRONIC TEST TEMPERATURE

	DATE								
	11-16-94	11-17	11-18	11-19	11-20	11-21	11-22	11-23	
AVG	25.2	25.3	25.0	25.0	25.2	25.1	25.0	25.0	
MAX									
MIN									
SUM. BY:	mw →								

COMMENTS:

SUPPLEMENTAL CHEMICAL DATA SUMMARY

PROJECT NO. TSE 142.32
 TEST DATE 11-16-94

CLIENT Onalaska Landfill
 SUMMARIZED BY ymw

LABORATORY CONTROL	CONTROL I.D.			
	545.ADL	545.AFL	545.CCL	545.CFL
TOTAL ALKALINITY mg/L CaCO3	64	64	70	56
HARDNESS mg/L CaCO3	90	80	95	75

SAMPLE DESCRIPTION	SAMPLE NO.			
	<u>Black River</u>	<u>545.02</u>		
TOTAL ALKALINITY mg/L CaCO3	<u>82</u>			
HARDNESS mg/L CaCO3	<u>115</u>			
TOTAL RESIDUAL CHLORINE mg/L	<u>NA</u>			
TOTAL AMMONIA mg/L	<u>0.02</u>			

SAMPLE DESCRIPTION	SAMPLE NO.			
	<u>Effluent</u>	<u>545.01</u>	<u>545.03</u>	<u>545.04</u>
TOTAL ALKALINITY mg/L CaCO3	<u>NA</u>	<u>164</u>	<u>184</u>	
HARDNESS mg/L CaCO3	<u>NA</u>	<u>215</u>	<u>165</u>	
TOTAL RESIDUAL CHLORINE mg/L	<u>0</u>	<u>0</u>	<u>0</u>	
TOTAL AMMONIA mg/L	<u>0.02</u>	<u>0.03</u>	<u>0.28</u>	

SAMPLE DESCRIPTION	SAMPLE NO.			
TOTAL ALKALINITY mg/L CaCO3				
HARDNESS mg/L CaCO3				
TOTAL RESIDUAL CHLORINE mg/L				
TOTAL AMMONIA mg/L				

NA = Not Analyzed
 * = Duplicate for QA

APPENDIX B
CHAIN-OF-CUSTODY FORMS



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name <u>Onalaska Groundwater Treatment Facility - Billwood</u>	Client Shipping Address <u>54650 W 8650 County Hwy Z, Onalaska, WI</u>	NPDES Number
---	--	--------------

Sample Kit Tracking Information	Method of Shipment (Check One)	Prepared by/Date: <u>[Signature]</u>	Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353
No. of Cooler <u>4</u> of <u>7</u>	<input type="checkbox"/> Fed X <input type="checkbox"/> Pickup <input type="checkbox"/> Other	Shipped by/Date: <u>11-9-94</u>	
Total No. of Bottles <u>1</u>	<input checked="" type="checkbox"/> UPS <input type="checkbox"/> Other		

Composite Sample Information	Description of Sampling Site	Sample Container
Flow Proportional <input type="checkbox"/> Time Interval <input checked="" type="checkbox"/> Samples/Hour <u>4</u> Volume/Sample <u>170 mL</u> Total Hours <u>24</u> Total Volume _____	<u>Effluent from Stripping Tower at old Onalaska Landfill site.</u>	Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>
Initiated: Date <u>11-13-94</u> Time <u>9:00 am</u> Ended: Date <u>11-14-94</u> Time <u>9:00 am</u>		Refrigerant Used For Shipping Wet Ice <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>
Chilled During Collection Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Sample(s) Shipped Via UPS Fed X <input checked="" type="checkbox"/> Other <input type="checkbox"/>
		Bioassays Required Acute <input checked="" type="checkbox"/> Chronic <input checked="" type="checkbox"/> Other <input type="checkbox"/>

Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
									<u>545.01</u>

Relinquished By and Title (Signature) <u>Operator William L. Wood</u>	Date <u>11-14-94</u>	Condition of Seal Upon Receipt by Lab <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____
	Time <u>10:00 am</u>	
Received By: (Signature)	Date	Received By Lab: (Signature)
	Time	<u>[Signature]</u>
		Date <u>11-15-94</u>
		Time

Client Name <i>Onalaska Ground Water Treatment Facility Bill Wood</i>		Client Shipping Address <i>W8650 County Hwy Z, Onalaska WI 54650</i>				NPDES Number											
Sample Kit Tracking Information		Method of Shipment (Check One)		Prepared by/Date: <i>KAREN M. FRANK</i>		Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353											
No. of Cooler <u>1</u> of <u>7</u>		<input type="checkbox"/> Fed X <input checked="" type="checkbox"/> Pickup <input type="checkbox"/> Other		Shipped by/Date: <i>11-9-94</i>													
Total No. of Bottles <u>1</u>		Wet Ice															
Composite Sample Information				Description of Sampling Site													
Flow Proportional <input type="checkbox"/>		Time Interval <input type="checkbox"/>															
Samples/Hour _____		Volume/Sample _____															
Total Hours _____		Total Volume _____															
Initiated: Date _____ Time _____		Ended: Date _____ Time _____															
Chilled During Collection Yes <input type="checkbox"/> No <input type="checkbox"/>																	
Sample Container		Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>		Refrigerant Used For Shipping		Wet Ice <input type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>											
Sample(s) Shipped Via		UPS <input checked="" type="checkbox"/> Fed X <input type="checkbox"/> Other <input type="checkbox"/>		Bioassays Required		Acute <input checked="" type="checkbox"/> Chronic <input checked="" type="checkbox"/> Other <input type="checkbox"/>											
Sample Description		Date		Time		Sample Type		No. of Containers		Volume		Sampled by (Signature)		Comments		For Lab Use Sample ID No.	
<i>River Water</i>		<i>11-15-94</i>		<i>11:30am</i>		<input type="checkbox"/> Comp <input checked="" type="checkbox"/> Grab		<i>1</i>		<i>5 gal</i>		<i>William L. Wood</i>				<i>545.02</i>	
Relinquished By and Title (Signature)		Date		Time		Condition of Seal Upon Receipt by Lab		Received By: (Signature)		Date		Time					
<i>Bill Wood Operator William L. Wood</i>		<i>11-15-94</i>		<i>3:30 PM</i>		<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____		<i>Karen M. Frank</i>		<i>11-16-94</i>		<i>10:30</i>					
Received By: (Signature)		Date		Time		Relinquished By: (Signature)		Date		Time		Received By Lab: (Signature)		Date		Time	

CH2M HILL

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name <u>Onalaska Ground Water Treatment Facility</u> <u>Bill Wood</u>		Client Shipping Address <u>W8650 County Hwy Z, Onalaska WI 54650</u>		NPDES Number					
Sample Kit Tracking Information		Method of Shipment (Check One)		Prepared by/Date: <u>[Signature]</u>					
No. of Cooler <u>2</u> of <u>7</u>		<input type="checkbox"/> Fed X <input type="checkbox"/> Pickup		Shipped by/Date: <u>11-9-94</u>					
Total No. of Bottles <u>1</u>		<input checked="" type="checkbox"/> UPS <input type="checkbox"/> Other		Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353					
Composite Sample Information			Description of Sampling Site						
Flow Proportional <input type="checkbox"/> Time Interval <input type="checkbox"/>									
Samples/Hour _____ Volume/Sample _____									
Total Hours _____ Total Volume _____									
Initiated: Date _____ Time _____									
Ended: Date _____ Time _____			Sample Container						
Chilled During Collection Yes <input type="checkbox"/> No <input type="checkbox"/>			Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>						
			Refrigerant Used For Shipping						
			Wet Ice <input type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>						
			Sample(s) Shipped Via						
			UPS <input checked="" type="checkbox"/> Fed X <input type="checkbox"/> Other <input type="checkbox"/>						
			Bioassays Required						
			Acute <input checked="" type="checkbox"/> Chronic <input checked="" type="checkbox"/> Other <input type="checkbox"/>						
Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
<u>River Water</u>	<u>11-15-94</u>	<u>11:30am</u>	<input type="checkbox"/> Comp	<input checked="" type="checkbox"/> Grab	<u>1</u>	<u>5 gal</u>	<u>William L. Wood</u>		<u>545.02</u>
Relinquished By and Title (Signature) <u>Operator William L. Wood</u>					Date <u>11-15-94</u>	Condition of Seal Upon Receipt by Lab			
					Time <u>8:50am</u>	<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____			
Received By: (Signature)		Date	Relinquished By: (Signature)		Date	Received By Lab: (Signature)		Date <u>11-16-94</u>	
		Time			Time	<u>Karen M. [Signature]</u>		Time <u>10:30</u>	



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name Onalaska Groundwater Treatment Facility Client Shipping Address 54650 W8650 County HWY Z, Onalaska WI NPDES Number _____
Bill Wood

Sample Kit Tracking Information Method of Shipment (Check One) Prepared by/Date: [Signature]
 No. of Cooler 3 of 7 Fed X Pickup Other _____
 Total No. of Bottles 1 ~~UPS~~ Other _____
 Shipped by/Date: 11-9-94

Ship Samples to:
 CH2M HILL Bioassay Laboratory
 15779 W. Ryerson Road
 New Berlin, WI 53151
 Phone: (414) 784-0448
 Fax: (414) 784-0353

Composite Sample Information
 Flow Proportional Time Interval
 Samples/Hour _____ Volume/Sample _____
 Total Hours _____ Total Volume _____
 Initiated: Date _____ Time _____
 Ended: Date _____ Time _____
 Chilled During Collection Yes No

Description of Sampling Site

Sample Container
 Plastic Glass New Used
 Refrigerant Used For Shipping
 Wet Ice Blue Ice Other
 Sample(s) Shipped Via
 UPS Fed X Other
 Bioassays Required
 Acute Chronic Other

Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
<u>River Grab</u>	<u>11-15-94</u>	<u>11:30am</u>		<input checked="" type="checkbox"/>	<u>1</u>	<u>5 gal</u>	<u>William L. Wood</u>		<u>545-02</u>

Relinquished By and Title (Signature) Operator William L. Wood

Date 11/15/94 Condition of Seal Upon Receipt by Lab
 Time 3:30pm Intact Other (Describe) _____

Received By: (Signature) _____
 Date _____
 Time _____

Relinquished By: (Signature) _____
 Date _____
 Time _____

Received By Lab: (Signature) [Signature]
 Date 11-16-94
 Time 1030



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name <u>Onalaska Groundwater Treatment Facility</u> <u>Bill Wood</u>	Client Shipping Address <u>W 8650 County Hwy Z, Onalaska, WI 54650</u>	NPDES Number
--	---	--------------

Sample Kit Tracking Information No. of Cooler <u>5</u> of <u>7</u> Total No. of Bottles <u>2</u>	Method of Shipment (Check One) <input type="checkbox"/> Fed X <input type="checkbox"/> Pickup <input checked="" type="checkbox"/> UPS <input type="checkbox"/> Other	Prepared by/Date: <u>[Signature]</u> Shipped by/Date: <u>11-9-94</u>	Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353
--	---	---	---

Composite Sample Information Flow Proportional <input type="checkbox"/> Time Interval <input type="checkbox"/> Samples/Hour _____ Volume/Sample _____ Total Hours _____ Total Volume _____ Initiated: Date _____ Time _____ Ended: Date _____ Time _____ Chilled During Collection Yes <input type="checkbox"/> No <input type="checkbox"/>	Description of Sampling Site	Sample Container Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/> Refrigerant Used For Shipping Wet Ice <input type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/> Sample(s) Shipped Via UPS <input checked="" type="checkbox"/> Fed X <input type="checkbox"/> Other <input type="checkbox"/> Bioassays Required Acute <input checked="" type="checkbox"/> Chronic <input checked="" type="checkbox"/> Other <input type="checkbox"/>
---	------------------------------	---

Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
<u>River Water</u>	<u>11-15-94</u>	<u>11:50am</u>		<input checked="" type="checkbox"/>	<u>1</u>	<u>5 gal</u>	<u>William L. Wood</u>		<u>545.02</u>

Relinquished By and Title (Signature) <u>Operator William L. Wood</u>	Date <u>11-15-94</u>	Condition of Seal Upon Receipt by Lab <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____
Received By: (Signature)	Date	Received By Lab: (Signature)
Time	Relinquished By: (Signature)	Date <u>11-16-94</u>
		Time <u>1030</u>

CH2M HILL

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name <u>Onalaska Ground Water Treatment Facility</u> <u>Bill Wood</u>		Client Shipping Address <u>54650 W8650 County Hwy Z, Onalaska, WI</u>			NPDES Number				
Sample Kit Tracking Information		Method of Shipment (Check One)		Prepared by/Date: <u>[Signature]</u>		Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353			
No. of Cooler <u>6</u> of <u>7</u>	<input checked="" type="checkbox"/> Fed X <input checked="" type="checkbox"/> <input type="checkbox"/> Pickup		Shipped by/Date: <u>11-9-94</u>						
Total No. of Bottles <u>2</u>		<input checked="" type="checkbox"/> UPS <input type="checkbox"/> Other							
Composite Sample Information			Description of Sampling Site			Sample Container			
Flow Proportional <input type="checkbox"/> Time Interval <input checked="" type="checkbox"/>						Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>			
Samples/Hour <u>4</u> Volume/Sample <u>170mL</u>						Refrigerant Used For Shipping			
Total Hours <u>24</u> Total Volume <u>3 gal</u>						Wet Ice <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>			
Initiated: Date <u>11-16</u> Time <u>12 noon</u>						Sample(s) Shipped Via			
Ended: Date <u>11-17</u> Time <u>12 noon</u>						UPS <input checked="" type="checkbox"/> Fed X <input checked="" type="checkbox"/> Other <input type="checkbox"/>			
Chilled During Collection Yes <input type="checkbox"/> No <input type="checkbox"/>						Bioassays Required			
						Acute <input checked="" type="checkbox"/> Chronic <input type="checkbox"/> Other <input type="checkbox"/>			
Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
<u>Effluent water</u>	<u>11-17-94</u>		<input checked="" type="checkbox"/>		<u>2</u>	<u>142 gal</u>	<u>William L. Wood</u>		<u>545-03</u>
Relinquished By and Title (Signature) <u>operator William L. Wood</u>					Date <u>11-17-94</u>	Condition of Seal Upon Receipt by Lab			
					Time <u>12:30</u>	<input type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____			
Received By: (Signature)		Date	Relinquished By: (Signature)			Date	Received By Lab: (Signature)		Date <u>11-18-94</u>
		Time				Time	<u>[Signature]</u>		Time <u>1600</u>



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name <i>Onalaska Groundwater Treatment Facility</i>	Client Shipping Address	NPDES Number
--	-------------------------	--------------

Sample Kit Tracking Information	Method of Shipment (Check One)	Prepared by/Date:	Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353
No. of Cooler _____ of _____	<input type="checkbox"/> Fed X _____ <input type="checkbox"/> Pickup _____	Shipped by/Date:	
Total No. of Bottles _____	<input type="checkbox"/> UPS _____ <input type="checkbox"/> Other _____		

Composite Sample Information	Description of Sampling Site	Sample Container
Flow Proportional <input type="checkbox"/> Time Interval <input checked="" type="checkbox"/>		Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>
Samples/Hour <u>4</u> Volume/Sample <u>170 ml</u>		Refrigerant Used For Shipping
Total Hours <u>2 1/4</u> Total Volume <u>2.5 gal</u>		Wet Ice <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>
Initiated: Date <u>11-17</u> Time <u>12:00</u>		Sample(s) Shipped Via
Ended: Date <u>11-18</u> Time <u>12:00</u>		UPS <input type="checkbox"/> Fed X <input type="checkbox"/> Other <input checked="" type="checkbox"/> <u>hand del.</u>
Chilled During Collection Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Bioassays Required
		Acute <input type="checkbox"/> Chronic <input checked="" type="checkbox"/> Other <input type="checkbox"/>

Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
<i>Process water</i>	<i>11-18-94</i>	<i>12:00 PM</i>	<input checked="" type="checkbox"/>		<i>1</i>	<i>2.5 gal</i>	<i>William L. Wood</i>		<i>545.04</i>

Relinquished By and Title (Signature) <i>Operator William L. Wood</i>	Date <i>11-18-94</i>	Condition of Seal Upon Receipt by Lab <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____
	Time <i>1600 hr</i>	
Received By: (Signature)	Date	Received By Lab: (Signature)
Time	Relinquished By: (Signature)	Time
		<i>James Stahl</i>
		Date <i>11-18-94</i>
		Time <i>1600</i>

APPENDIX C
REFERENCE TOXICANT DATA

Table 1. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee, WI

Test Type: Acute

Organism: *Ceriodaphnia dubia*

Age < 24 Hours

of Organisms / Conc.: 20

Test Duration: 48 Hours

Toxicant: Sodium Chloride

Response: Mean % Survival

Calculation: LC50

Reporting Period: January 94 - December 94

<u>Test No</u>	<u>Test Date</u>	<u>Test LC50 (g/L)</u>	<u>12 Month Control Limits In or Out</u>			<u>Control</u>	<u>Action if Out of Control</u>
			<u>Mean LC50</u>	<u>Mean +2 S.D.</u>	<u>Mean -2 S.D.</u>		
52	1/18/94	2.21	2.49	2.83	2.15	IN	
53	2/22/94	2.45	2.49	2.83	2.16	IN	
54	3/23/94	2.45	2.47	2.76	2.17	IN	
55	4/13/94	2.45	2.47	2.76	2.17	IN	
56	5/31/94	2.67	2.48	2.80	2.17	IN	
57	6/29/94	2.32	2.47	2.80	2.14	IN	
58	7/29/94	2.45	2.48	2.80	2.17	IN	
59	8/31/94	2.52	2.49	2.80	2.17	IN	
60	9/28/94	2.58	2.47	2.73	2.21	IN	
61	10/18/94	2.45	2.47	2.73	2.21	IN	
62	11/28/94	1.54	2.38	2.95	1.80	OUT	a
63	12/14/94	2.60	2.39	2.98	1.80	IN	

a = water batch had low hardness (<70 mg/L); Retest 12/14/94

Table 2. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee, WI

Test Type: Acute

Organism: *Daphnia magna*

Age: < 24 Hours

of Organisms / Conc.: 20

Test Duration: 48 Hours

Toxicant: Sodium Chloride

Response: Mean % Survival

Calculation: LC50

Reporting Period: November 93 - October 94

Test No	Test Date	Test LC50 (g/L)	12 Month Control Limits			In or Out of Control	Action if Out of Control
			Mean LC50	Mean +2 S.D.	Mean -2 S.D.		
48	11/23/93	4.90	4.83	5.65	4.01	IN	
49	12/21/93	4.90	4.77	5.40	4.13	IN	
50	1/18/94	4.90	4.77	5.40	4.13	IN	
51	2/22/94	4.90	4.79	5.42	4.16	IN	
52	3/23/94	4.99	4.76	5.31	4.21	IN	
53	4/13/94	4.90	4.76	5.31	4.21	IN	
54	5/31/94	4.99	4.82	5.28	4.35	IN	
55	6/29/94	4.90	4.87	5.18	4.56	IN	
56	7/29/94	4.90	4.87	5.18	4.56	IN	
57	8/31/94	4.65	4.89	5.06	4.73	OUT	*No action taken; data too tight
58	9/28/94	4.51	4.86	5.14	4.58	OUT	*No action taken; data too tight
59	10/18/94	4.64	4.84	5.14	4.53	IN	

*Comment The LC50s of tests 57 and 58 were 5% and 7% different, respectively, from the mean LC50.

As the variance has been too low (tight) due to many of the previous tests with identical results, no action was taken. This is due to an artifact of the statistical analysis.

Table 3. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee, WI

Test Type: Acute

Organism: *Pimephales promelas*

Age: 10 ± 2 Days

of Organisms / Conc.: 20

Test Duration: 96 Hours

Toxicant: Sodium Chloride

Response: Mean % Survival

Calculation: LC50

Reporting Period: January 94 - December 94

<u>Test No</u>	<u>Test Date</u>	<u>Test LC50 (g/L)</u>	<u>12 Month Control Limits</u>			<u>In or Out of Control</u>	<u>Action if Out of Control</u>
			<u>Mean LC50</u>	<u>Mean +2 S.D.</u>	<u>Mean -2 S.D.</u>		
50	1/18/94	7.87	7.04	9.07	5.00	IN	
51	2/14/94	7.24	6.95	8.84	5.06	IN	
52	3/14/94	6.67	6.88	8.73	5.03	IN	
53	4/18/94	8.31	6.95	8.94	4.95	IN	
54	5/16/94	9.53	7.23	9.56	4.90	IN	
55	6/13/94	6.49	7.26	9.54	4.98	IN	
56	7/11/94	5.47	7.17	9.64	4.69	IN	
57	8/8/94	5.41	7.07	9.72	4.42	IN	
58	9/12/94	5.81	6.91	9.60	4.22	IN	
59	10/10/94	5.79	6.85	9.61	4.09	IN	
60	11/7/94	5.76	6.61	9.16	4.06	IN	
61	12/8/94	5.98	6.63	9.16	4.09	IN	

Table 4. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee
Test Type: Chronic
Organism: *Ceriodaphnia dubia*
Age: < 24 Hours
of Organisms / Conc.: 10
Test Duration: 7 days
Toxicant: Sodium Chloride
Response: Mean No. of Young per Adult
Calculation: 25% Inhibition Concentration (IC25)
Reporting Period: December 93 - November 94

<u>Test No</u>	<u>Test Date</u>	<u>IC25 (g/L)</u>	<u>Mean IC25</u>	<u>Mean +2 S.D</u>	<u>Mean -2 S.D.</u>	<u>In or Out</u>	
						<u>Control</u>	<u>Action if Out of Control</u>
49	12/3/93	1.01	1.01	1.41	0.61	IN	
50	1/7/94	0.71	0.98	1.40	0.56	IN	
51	2/22/94	0.85	0.96	1.37	0.54	IN	
52	4/5/94	1.06	0.99	1.36	0.61	IN	
53	5/4/94	1.27	1.01	1.42	0.60	IN	
54	5/31/94	1.05	1.01	1.42	0.60	IN	
55	6/18/94	1.12	1.04	1.42	0.66	IN	
56	7/8/94	1.08	1.05	1.42	0.67	IN	
57	8/4/94	1.09	1.05	1.43	0.67	IN	
58	9/16/94	0.95	1.01	1.32	0.70	IN	
59	10/22/94	0.84	0.99	1.30	0.68	IN	
60	11/28/94	0.84	0.97	1.29	0.65	IN	

Table 5. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee
Test Type: Chronic
Organism: *Ceriodaphnia dubia*
Age: < 24 Hours
of Organisms / Conc.: 10
Test Duration: 7 days
Toxicant: Sodium Chloride
Response: Mean 7- day % Survival and No. of Young per Adult
Calculation: NOEC and LOEC
Reporting Period: November 93 - October 94

Test No	Test Date	Survival		Reproduction		Comments
		NOEC (g/L)	LOEC (g/L)	NOEC (g/L)	LOEC (g/L)	
48	11/12/93	2.00	4.00	0.50	1.00	
49	12/3/93	2.00	4.00	0.50	1.00	
50	1/7/94	2.00	4.00	0.50	1.00	
51	2/22/94	2.00	4.00	0.50	1.00	
52	4/5/94	1.00	1.50	1.00	1.50	
53	5/4/94	1.50	2.00	1.00	1.50	
54	5/31/94	2.00	4.00	0.50	1.00	
55	6/18/94	2.00	4.00	0.50	1.00	
56	7/8/94	2.00	4.00	0.50	1.00	
57	8/4/94	1.50	2.00	0.50	1.00	
58	9/16/94	1.00	1.50	0.50	1.00	
59	10/22/94	2.00	4.00	1.00	1.50	
60	11/28/94	2.00	4.00	0.50	1.00	

Test on 3/29/94 failed acceptability criterion for reproduction; Retest 4/5/94
 Test on 5/4/94 for April test requirement

Table 6. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee
Test Type: Chronic
Organism: *Pimephales promelas*
Age: < 24 Hours
of Organisms / Conc.: 40
Test Duration: 7 days
Toxicant: Sodium Chloride
Response: Mean Growth (mg per number of organisms exposed)
Calculation: 25% Inhibition Concentration (IC25)
Reporting Period: December 93 - November 94

Test No	Test Date	IC25 (g/L)	12 Month Control Limits (IC25) In or Out			Control	Action if Out of Control
			Mean IC25	Mean +2 S.D.	Mean -2 S.D.		
45	12/9/93	0.60	0.55	0.73	0.37	IN	
46	1/11/94	0.33	0.53	0.75	0.32	IN	
47	2/7/94	0.51	0.55	0.71	0.39	IN	
48	3/3/94	0.60	0.56	0.72	0.40	IN	
49	4/12/94	0.40	0.54	0.72	0.36	IN	
50	5/16/94	0.59	0.54	0.72	0.36	IN	
51	6/30/94	0.90	0.57	0.85	0.30	OUT	New lab media used - MHRW as diluent.
52	7/25/94	0.54	0.56	0.84	0.29	IN	
53	8/31/94	0.48	0.55	0.83	0.28	IN	
54	9/28/94	0.61	0.55	0.83	0.28	IN	
55	10/18/94	0.60	0.56	0.84	0.28	IN	
56	11/15/94	0.57	0.56	0.84	0.28	IN	

Table 7. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee
Test Type: Chronic
Organism: *Pimephales promelas*
Age: < 24 Hours
of Organisms / Conc.: 40
Test Duration: 7 days
Toxicant: Sodium Chloride
Response: Mean % 7 day Survival and Growth (mg)
Calculation: NOEC and LOEC
Reporting Period: December 93 - November 94

<u>Test No</u>	<u>Test Date</u>	<u>Survival</u>		<u>Growth</u>		<u>Comments and Action</u>
		<u>NOEC (g/L)</u>	<u>LOEC (g/L)</u>	<u>NOEC (g/L)</u>	<u>LOEC (g/L)</u>	
45	12/9/93	0.30	1.50	0.30	1.50	
46	1/11/94	0.30	1.50	0.30	1.50	
47	2/7/94	0.30	1.50	0.30	1.50	
48	3/3/94	0.30	1.50	0.30	1.50	
49a	4/12/94	0.30	0.60	0.30	0.60	a: Different dilution series used
50	5/16/94	0.30	1.50	0.30	1.50	
51	6/30/94	1.50	3.00	0.30	1.50	
52	7/25/94	0.30	1.50	0.30	1.50	
53	8/31/94	0.30	1.50	0.30	1.50	
54	9/28/94	0.30	1.50	0.30	1.50	
55	10/18/94	0.30	1.50	0.30	1.50	
56	11/15/94	0.30	1.50	0.30	1.50	